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10/536,641

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EXAMINER

SHAH, TANMAY K

ART UNIT

PAPER NUMBER

2611

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/536,641	Applicant(s) D'ALESSANDRO, PIERLUIGI	
	Examiner TANMAY K. SHAH	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-8 and 10-20 is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is in response to the Amendment to application 10/536,641 filed on 9/10/09.

Response to Arguments

2. Applicant's arguments filed 9/10/09 have been fully considered but they are not persuasive.

Claim Rejections - 35 USC § 112

3. Applicant argues that the amended claim 2 overcome the 112 rejection. Examiner still believes it is not definite. Examiner maintains the rejection. Examiner explains again below the reason for indefinite claim. As described in previous office action a first value in claim 1, is further defined in claim 2. However, if the first value is cross-correlation of the I and Q component, it can not be a ratio of cross correlation of I and Q components to mean value of square of the I component. Again, the applicant contradicts himself with the first value.

Claim Rejections - 35 USC § 102

4. Applicant argues that the amended claim 1, specifically the phase and gain imbalance prior to symbol synchronization with use of cross correlation values of uncompensated I and uncompensated Q components is not taught by Wiss.

In response to above-mentioned arguments, applicant's interpretation of the applied reference has been considered. However, the applied reference teaches limitations of argued matter.

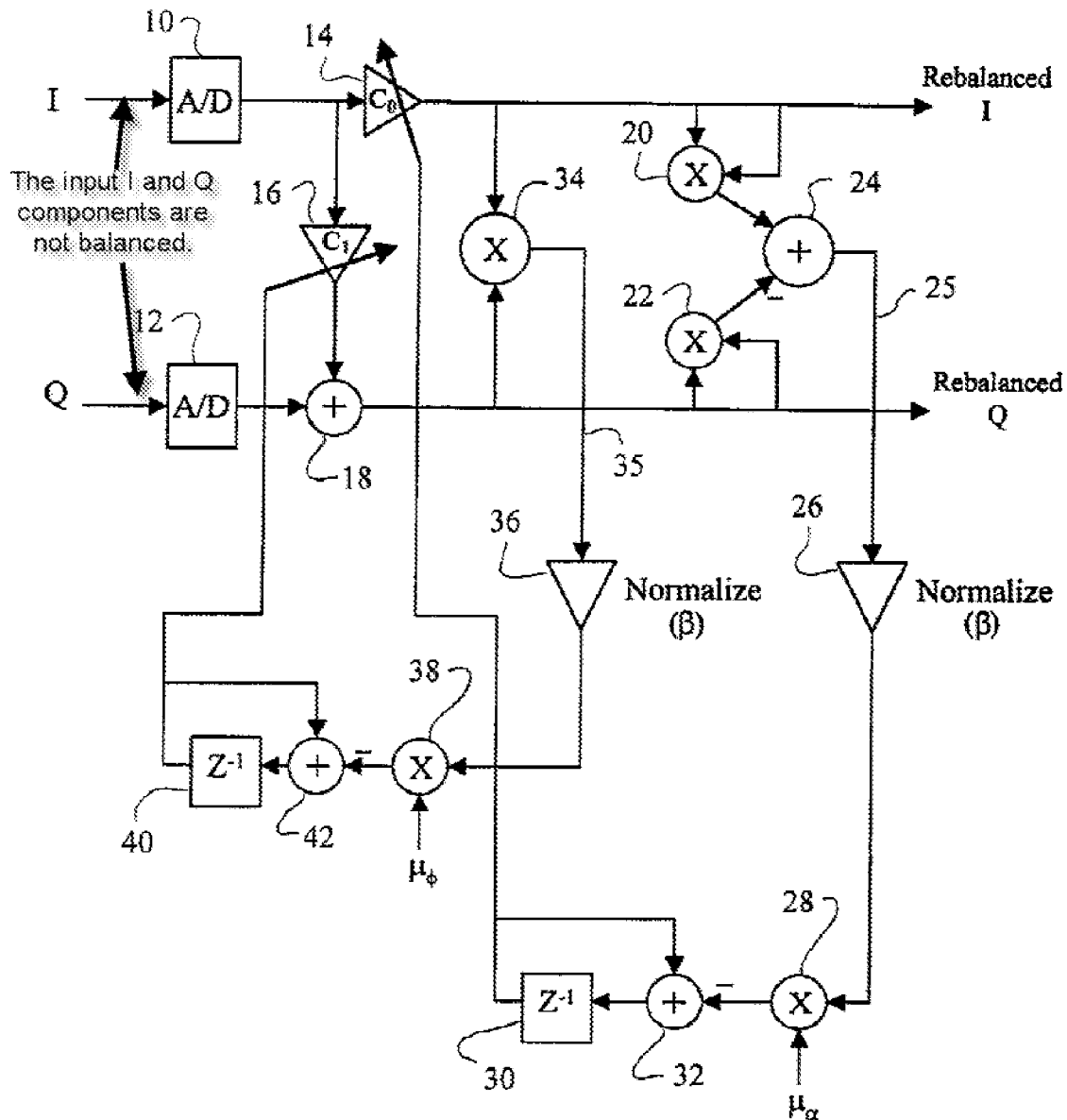
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First, the examiner again explains that it is inherent to one of the ordinary skilled in the art that the symbol synchronization can not be performed if the I and Q components are not corrected. In other words, if the I and Q components are not balanced it is impossible to perform the symbol synchronization. so, the symbol synchronization has to be performed after the phase and gain rebalancing.

Second, the amended claim specifically disclose that is uses a first value which is a cross correlation of the uncompensated I and uncompensated Q components.

In response to above-mentioned arguments, applicant's interpretation of the applied reference has been considered. However, the applied reference teaches limitations of argued matter.

As shown in figure below, the examiner explains in further detail how the phase and gain rebalancing process is done.



As, shown in Figure above (Fig. 5 of Wiss), the input I and Q components are not balanced. As shown in figure above they are being multiplied (or cross correlated) in step 34 and then normalized in 26 and 36 based on the value compensated the gain and phase imbalance is calculated and the then the μ (alpha for gain and phi for gain is

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multiplied) for correction and finally it amplifier using parameter C_0 and C_1 . so, they are being balanced and outputted as shown in Fig. 5.

Applicant also argues that Wiss does not teach compensating phase imbalance or gain imbalance utilizing in QPSK modulation receiver and modulation scheme based on a complex scrambling code.

The phase imbalance or gain imbalance utilizing in QPSK modulation receiver and modulation scheme based on a complex scrambling code is not given any patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recited the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness, but, instead, the process steps or structural limitations are able to stand alone. See *In re Hiraio*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Regarding claim 11, same reasons are applicable.

Regarding claim 12 and 13, applicant argues that Wiss does not teach the determining a modified error function by adding the integrated and filtered error function to a product of the integrated and filtered error function and a parameter based on speed and stability.

In response to above-mentioned arguments, applicant's interpretation of the applied reference has been considered. However, the applied reference teaches limitations of argued matter.

Again, as described in previous office action according to Fig. 5 Wiss. i.e. as shown in Fig. 5 the normalized (output of 36 and 26) is being multiplied with a parameter μ_ϕ at 38 and then being added at step 42 with the integrated step 40 function. So, it is the filtered and then integrated function and as shown in Fig. 5, the integrated is again added to the filtered and the integrated signal. Also, as described on page 5, paragraph 63, the convergence parameters are based on the speed and stability. (i.e. it converges to speed 0.001 seconds and specific SNR or BER (stability)).

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4 – 8, 10 – 13, 15 - 20 are rejected under 35 U.S.C. 102(b) as being anticipated by **Wiss (US 20020097812)**.

Regarding claim 1, a receiver for estimation and compensation of phase imbalance or gain imbalance, the receiver utilizing a QPSK modulation and a modulation scheme based on a complex scrambling code, the receiver comprising:

a circuit that estimates the phase imbalance or gain imbalance (**i.e. as shown in Fig. 5 and described in page 4, paragraph 58 it rebalances the I and Q component and estimates error or error functions which determines the imbalance or estimates imbalance.**) prior to symbol synchronization (**It is inherent to one of the ordinary skilled in the art to perform synchronization of the rebalanced I and Q component, the synchronization can not be performed if I and Q are imbalanced or offset**) using a first value related to a cross correlation of an uncompensated I component and a uncompensated Q component of an incoming I/Q modulated signal (**i.e. in the presence of a phase imbalance, ϵ_ϕ is an average cross correlation of the I and Q channels after the rebalancer, page 4, paragraph 54, again applicant reminded that the claim limitation says one of those three values**); and

means for compensating the I and Q components of the incoming I/Q modulated signal to provide compensated I and Q components (**i.e. as shown in Fig. 5 and described in page 4, paragraph 58 it rebalances the I and Q component and estimates error or error functions which determines the imbalance or estimates imbalance. Page 1, paragraph 16 describes the signal is modulated**) for symbol synchronization (**It is inherent to one of the ordinary skilled in the art to perform synchronization of the rebalanced I and Q component, the synchronization can not be performed if I and Q are offset, it is inherent and well know in the art to synchronized rebalanced or compensated I and Q**).

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Regarding claim 4, The receiver according to claim 1, where the means for compensating the I and Q components of the incoming I/Q modulated signal includes means for compensating the phase imbalance or gain imbalance before synchronization (as described in claim 1, again i.e. as shown in Fig. 5 and described in page 4, paragraph 58 it rebalances the I and Q component and estimates error or error functions which determines the imbalance or estimates imbalance. It is inherent to one of the ordinary skilled in the art to perform synchronization of the rebalanced I and Q component, the synchronization can not be performed if I and Q are offset, it is inherent and well know in the art to synchronized rebalanced or compensated I and Q) based on at least one first ratio selected from the group consisting of a second ratio, a third ratio and a fourth ratio, wherein the second ratio is a ratio between a cross correlation of said I and Q components of the incoming I/Q modulated signal and a mean value of a square of the I component, wherein the third ratio is a ratio between the cross correlation of the I and Q components and a square root of a product between a mean value of the square of the I component and a mean value of a square of the Q component (i.e. please refer to equation below page 4, paragraph 53, it is a square root of product of mean value of the square of I and



$$\alpha = \frac{\sqrt{\langle I_{MS}^2 \rangle}}{\sqrt{\langle Q_{MS}^2 \rangle}}$$

square of Q, also it is being showed below), and

wherein the fourth ratio is a ratio between the mean value of the square of the Q component and the mean value of the square of the component.

Regarding claim 5, the receiver according to claim 1, wherein the receiver comprises a WCDMA (UMTS) receiver and wherein a feed-forward scheme or a feed-back scheme is established in the receiver (**i.e. shown in Fig. 5 it feedbacks the 14 and 16 to 36 and 26 again, so it is a feed-back scheme, does not specifically disclose it is a WCDMA receiver, but since it receives multi carrier signal it can be implemented in WCDMA (MUTS) receiver**).

Regarding claim 6, The receiver according to claim 1, wherein the estimation of the phase imbalance or gain imbalance is carried out iteratively (**page 4, paragraph 54, Determining a iteratively will generate an error that is equal to the gain imbalance. In the presence of a phase imbalance, ϵ_{PHI} is an average cross correlation of the I and Q channels after the rebalancer**).

Regarding claim 7, A method for estimation and compensation of phase imbalance or gain imbalance in a receiver utilizing a QPSK modulation and a modulation scheme based on a complex scrambling code, the demodulation method comprising the step of:

estimating the phase imbalance or gain imbalance of an incoming I/Q modulated signal before symbol synchronization (**as described in claim 1, again i.e. as shown in Fig. 5 and described in page 4, paragraph 58 it rebalances the I and Q component**

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and estimates error or error functions which determines the imbalance or estimates imbalance. It is inherent to one of the ordinary skilled in the art to perform synchronization of the rebalanced I and Q component, the synchronization can not be performed if I and Q are offset, it is inherent and well know in the art to synchronized rebalanced or compensated I and Q) using at least one of a first value related to a cross correlation of an I component and a Q component of the modulated signal, a second value related to a cross correlation of a compensated I component and a compensated Q component of the modulated signal, and a third value related to a square of the compensated I component and a square of the compensated Q component of the modulated signal (i.e. in the presence of a phase imbalance, ϵ_ϕ is an average cross correlation of the I and Q channels after the rebalancer, page 4, paragraph 54); and

compensating the phase imbalance or gain imbalance on the basis of the at least one first ratio such that a feed-forward scheme or a feed-back scheme is established (i.e. as shown in Fig. 5, the corrected output of 14 and 18 which is being fed back to the system again so it does the process repeatedly or iteratively, as described in page 4, paragraph 58, since it feed backs data, it is considered fee-back scheme); and

wherein providing estimated and compensated I and Q components of the incoming I/Q modulated signal are provided for symbol synchronization (i.e. as shown in Fig. 5 and described in page 4, paragraph 58 it reblances the I and Q component and estimates error or error functions which determines the

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imbalance or estimates imbalance. It is inherent to one of the ordinary skilled in the art to perform synchronization of the rebalanced I and Q component, the synchronization can not be performed if I and Q are offset, it is inherent and well know in the art to synchronized rebalanced or compensated I and Q).

Regarding claim 8, there are substantially same limitations as claim 4, thus the same rejection is applicable.

Regarding claim 10, there are substantially same limitations as claim 6, thus the same rejection is applicable.

Regarding claim 11, there are substantially same limitations as claim 7, thus the same rejection is applicable.

Regarding claim 12, A method, comprising:

iteratively compensating a phase imbalance or gain imbalance in a receiver (**i.e. as shown in Fig. 5, the corrected output of 14 and 18 which is being fed back to the system again so it does the process repeatedly or iteratively, It rebalances the phase and gain imbalance as described in page 4, paragraph 58, also page 3,**

paragraph 54 discloses the process is done iteratively), the receiver utilizing a QPSK modulation and a modulation scheme based on a complex scrambling code, of the iteratively compensating including (i.e. It is a further object of this invention to provide such compensation which requires no tone insertion, and is independent of the modulation employed by the system, page 1, paragraph 16, So regardless of any modulation scheme it will be able to perform the steps of method below):

a) determining an error function (i.e. the error function are considered output of 34 and output of 24 of Fig. 5, as described in the application the error function is just a multiplication of corrected I and Q function, paragraph 14 of **specification**) on the basis of samples of phase compensated in- phase components and quadrature components of a revived I/Q modulated signal (as shown in Fig. 5 the receiver receives the I (in-phase) and Q (Quadrature-phase) component, as shown in the figure it is being fed in to the A/D converter so it samples the I and Q component of the received signal, please refer to Fig. 5);

b) filtering the error function (i.e. the output of 34 and 24 is being fed into the normalized function 36 and 26, as described in page 4, paragraph 59 They account for signal level fluctuations into the receiver. These functions have the effect of ensuring constant adaptation behavior regardless of input signal level. For a given system these blocks may be set to a constant less than unity, so it is a filtering function);

c) integrating the filtered error function (i.e. as shown in Fig. 5, component 40 integrates the output of the normalize function 36 and 26, The output of 28 is then digitally integrated by a register 30, The output of 38 is then digitally integrated by a register 40, page 4, paragraph 58);

d) determining a modified error function by adding the integrated (i.e. as shown in Fig. 5, the normalized (36 and 26 of Fig. 5) and integrated (40 and 30 of Fig. 5)) and filtered error function (i.e. the output of the normalize function 36 and 26 of Fig. 5) to a product of the integrated and filtered error function and a parameter based on speed and stability (i.e. Fig. 5 the normalized (output of 36 and 26) is being multiplied with a parameter μ_ϕ at 38 and then being added at step 42 with the integrated step 40 function. So, it is the filtered and then integrated function and as shown in Fig. 5, the integrated is again added to the filtered and the integrated signal. Also, as described on page 5, paragraph 63, the convergence parameters are based on the speed and stability. (i.e. it converges to speed 0.001 seconds and specific SNR or BER (stability));

e) determining a corrected output signal of the I/Q components of the received signal on the basis of subsequent samples of phase compensated in-phase components and quadrature components of the received I/Q modulated signal and the modified error function (i.e. the output of the 14 and 18 is rebalanced as described in page 4, paragraph 58, again as described above the I and Q are being sampled by A/D 10 and 12 of Fig. 5 and it is subsequent as shown in page 2 and 3, paragraph 39, also the received signal is modulated and the modified error

function is the output of 40 as described above in step d);

f) returning to step a (i.e. as shown in Fig. 5 the output is being fed back to the normalize function 36 and 26 again so it repeats step a again); and

providing estimated and compensated I and Q components of the received I/Q modulated signal to a symbol synchronizer for synchronization **(i.e. as shown in Fig. 5 and described in page 4, paragraph 58 it rebalances the I and Q component and estimates error. It is inherent to one of the ordinary skilled in the art to perform synchronization of the rebalanced I and Q component, the synchronization can not be performed if I and Q are offset).**

Regarding claim 13, A method, comprising:

iteratively compensating a phase imbalance or gain imbalance in a receiver **(i.e. as shown in Fig. 5, the corrected output of 14 and 18 which is being fed back to the system again so it does the process repeatedly or iteratively, It rebalances the phase and gain imbalance as described in page 4, paragraph 58),** the receiver utilizing a QPSK modulation and a modulation scheme based on a complex scrambling code, of the iteratively compensating including **(i.e. It is a further object of this invention to provide such compensation which requires no tone insertion, and is independent of the modulation employed by the system, and the adaptive performance of which is excellent even at low SNR, page 1, paragraph 16, So**

regardless of any modulation scheme it will be able to perform the steps of method below):

a) determining an error function (i.e. **the error function are considered output of 34 and output of 24 of Fig. 5, as described in the application the error function is just a multiplication of corrected I and Q function, paragraph 14 of specification**) on the basis of samples of phase compensated in- phase components and quadrature components of a revived I/Q modulated signal (**as shown in Fig. 5 the receiver receives the I (in-phase) and Q (Quadrature-phase) component, as shown in the figure it is being fed in to the A/D converter so it samples the I and Q component of the received signal, please refer to Fig. 5);**

b) filtering the error function (i.e. **the output of 34 and 24 is being fed into the normalized function 36 and 26, as described in page 4, paragraph 59 They account for signal level fluctuations into the receiver. These functions have the effect of ensuring constant adaptation behavior regardless of input signal level. For a given system these blocks may be set to a constant less than unity, so it is a filtering function**);

c) integrating the filtered error function (i.e. **as shown in Fig. 5, component 40 integrates the output of the normalize function 36 and 26, The output of 28 is then digitally integrated by a register 30, The output of 38 is then digitally integrated by a register 40, page 4, paragraph 58**);

d) determining a modified error function by adding the integrated (i.e. **as shown in Fig. 5, the normalized (36 and 26 of Fig. 5) and integrated (40 and 30 of Fig. 5)**)

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and filtered error function (i.e. the output of the normalize function 36 and 26 of Fig. 5) to a product of the integrated and filtered error function and a parameter based on speed and stability (i.e. as shown in Fig. 5 the normalized (output of 36 and 26) is being multiplied with a parameter μ_ϕ at 38 and then being added at step 42 with the integrated step 40 function, page 4, paragraph 58, as described the abstract an initial set of convergence parameters can be applied to speed-up the start of convergence, and a second set of smaller values can be applied some time later for more precise convergence);

e) determining a gain on the basis of a product of the modified error function and a factor (i.e. the digitized I component is then amplified, i.e., multiplied by a circuit 14 having a variable coefficient $C_{\text{sub}.0}$, the coefficient being a function of a gain imbalance loop described below, the output of circuit 14 being a rebalanced I. The digitized I component is also multiplied by a circuit 16 having a variable coefficient $C_{\text{sub}.1}$, the coefficient being a function of a phase imbalance loop described below, page 4, paragraph 58);

f) determining a corrected output signal of the I/Q components of the received signal on the basis of subsequent samples of phase compensated in-phase components and quadrature components of the received I/Q modulated signal and the modified error function (i.e. the output of the 14 and 18 is rebalanced as described in page 4, paragraph 58, again as described above the I and Q are being sampled by A/D 10 and 12 of Fig. 5 and it is subsequent as shown in page 2 and 3,

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paragraph 39, also the received signal is modulated and the modified error function is the output of 40 as described above in step d);

g) returning to step a (i.e. as shown in Fig. 5 the output is being fed back to the normalize function 36 and 26 again so it repeats step a again); and providing estimated and compensated I and Q components of the received I/Q modulated signal to a symbol synchronizer for synchronization **(i.e. as shown in Fig. 5 and described in page 4, paragraph 58 it rebalances the I and Q component and estimates error. It is inherent to one of the ordinary skilled in the art to perform synchronization of the rebalanced I and Q component, the synchronization can not be performed if I and Q are offset).**

Regarding claim 15, there are substantially same limitations as claim 5, thus the same rejection is applicable.

Regarding claim 16, there are substantially same limitations as claim 4, thus the same rejection is applicable.

Regarding claim 17, there are substantially same limitations as claim 2, thus the same rejection is applicable.

Regarding claim 18, there are substantially same limitations as claim 4, thus the same rejection is applicable.

Regarding claim 19, there are substantially same limitations as claim 2, thus the same rejection is applicable.

Regarding claim 20, there are substantially same limitations as claim 4, thus the same rejection is applicable.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 2 rejected under 35 U.S.C. 103(a) as being unpatentable over **Wiss (US 20020097812)** in further view of **Richards et al. US (6,289,048)**.

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Regarding claim 2, Wiss teaches normalization function which is considered as filtering of the signal. **(i.e. the output of 34 and 24 is being fed into the normalized function 36 and 26, as described in page 4, paragraph 59 They account for signal level fluctuations into the receiver. These functions have the effect of ensuring constant adaptation behavior regardless of input signal level. For a given system these blocks may be set to a constant less than unity, so it is a filtering function).** However does not specifically disclose that the filter is a low-pass filter.

Richards teaches a low pass filter for low pass filtering the signal **(i.e. 118 – 124 of Fig. 3).**

It would have been an obvious matter of design choice to one skilled in the art at the time the invention was made to use low-pass filter as provided by the inventor since applicant has not disclosed that this solves any stated problem or is anything more than hardware choice. A person of ordinary skill in the art would find obvious for the purpose of filtering unwanted noise. In re Dailey and Eilers, 149 USPQ 47 (1966) see MPEP 2144.04.

9. Claim 14 rejected under 35 U.S.C. 103(a) as being unpatentable over **Wiss (US 20020097812)** in further view of Cochran (US 6,442,217).

Regarding claim 14, Wiss teaches the receiver according to claim 1, however does not specifically disclose comprising means for symbol synchronization which receives the

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estimated and compensated I and Q components and performs synchronization of the components.

Cochran teaches means for symbol synchronization which receives the estimated and compensated I and Q components and performs synchronization of the components (i.e. a communication system (10) includes a transmitter (12) which induces in a communication signal (16), a first component of in-phase to quadrature phase (I-Q) imbalance and a receiver (14) which adds a second component of I-Q imbalance. A digital, intermediate frequency (IF) I-Q balancer (38) compensates for the receiver-induced I-Q imbalance so that total distortion is sufficiently diminished and a data directed carrier tracking loop (60) may then perform carrier synchronization to generate a baseband signal (70), abstract).

It would have been obvious to one of the ordinary skilled in the art at the time the invention was made to combine the teachings of Wiss with Cochran. One would be motivated to combine these teachings because in doing so it will provide synchronized output which is desired in communication system.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANMAY K. SHAH whose telephone number is (571)270-3624. The examiner can normally be reached on Mon-Thu (7:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TANMAY K SHAH/
Examiner, Art Unit 2611

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/David C. Payne/

Supervisory Patent Examiner, Art Unit 2611